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May 1945

REPORT OF THE

S T A T E F O R E S T E R

On the Emergency
Project of 1945

B U R N E Y - M c C L O U D

F O R E S T I N S E C T C O N T R O L

P R O J E C T

State of California
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY

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REPORT ON EMERGENCY INSECT CONTROL PROJECT IN THE BURNEY-McCLOUD AREA OF SHASTA & SISKIYOU COUNTIES

I Introduction:

The Bureau of Entomology and Plant Quarantine has for several years been carrying on insect investigations in the Burney-McCloud areas of Shasta and Siskiyou counties. As a result of these investigations, the Bureau recommended that certain control measures be taken to halt a serious outbreak of bark beetles in ponderosa pine stands.

Acting upon this recommendation, the State Forester of California set up a zone of infestation and the Burney-McCloud insect control project was organized as a cooperative undertaking by State, Federal, and private agencies. The principal insects involved were Ips engraver beetles (Ips confusus and Ips oregoni) and the Western pine beetle (Dendroctonus brevicomis), but flathead borers were involved to a lesser extent.

The control project had four basic objectives:

1. To break up the increasing epidemic infestation by destroying the maximum number of beetles at the least possible cost.

2. To utilize through logging and salvage the maximum of timber destroyed by insects.

3. To determine the economic factors of such a control project.

4. To train Division of Forestry personnel in insect control techniques.

In order to attain these objectives, a high degree of coordination was necessary among all agencies involved. Entomological techniques had to be integrated with administrative and fiscal considerations and the practical problems of logging. It should be stated here that it is felt that our objectives were attained, and it was only possible to do so because of the splendid cooperation shown by all those concerned.

Since each public and private agency had to approach its phase of the project in a manner peculiar to its own requirements, this report concerns itself primarily with the activities of the Division of Forestry and their findings.

II Agreements:

Since the Division of Forestry is not a land owner, but generally operates on the lands of others, it was necessary to solicit formal agreements from land owners before any control measures could be undertaken on their property. While the State Forester, under these

agreements if be deemed it wise, could perform all of the insect control work on limited areas, the ratio of State to private cooperation on the area as a whole could not exceed 50 per cent. This ratio for sharing expenses, however, was only a trial or experimental figure and did not necessarily establish a ratio of cooperation that could not be changed for other projects.

The State Forester entered into cooperative agreements as listed in Table I (see appendix A for samples of agreements).

TABLE I AGREEMENTS

Cooperator	Acreage Involved	Cooperator's Contribution	State's Contribution
McCloud Lmbr. Co.	1920	8000.00	1000.00
Burney Lmbr. Co.	240	300.00	300.00
Scott Lmbr. Co.	120	100.00	100.00
Fruit Growers Supply Co.	6000	3000.00	4000.00
R.W. & A.R. Haynes	1280	650.00	800.00
Ednah M. Black	840	300.00	250.00
Ella P. Braden	160	27.50	200.00
Barbara Startt	160	27.50	200.00
A. P. Taylor	280	30.00	150.00
David Doyel	20	-------	50.00
Totals	11,020	12,435.00	7,050.00

The monetary figures in Table I are those which were actually written into the agreements, and since the agreements called for estimated figures only, they do not necessarily represent the actual expenditures of the State and cooperators. This was a basic weakness in the agreements since it is impossible to estimate with any degree of accuracy the cost of a particular control job prior to the spotting process.

From a practical field operating standpoint, it would be extremely desirable to devise some plan whereby the necessity of gaining formal signed agreements could be forgotten since they were too often a barrier to completing the work in the Entomological units in a systematic manner. However, since this is probably not possible, it

seems that the following problems should be considered in future agreements:

1. The ratio of contribution between the State and cooperator should be left to the discretion of the State Forester.

2. A method of treating infested trees on the lands of absentee owners or on lands under litigation should be devised.

3. The agreement should be simplified in order that it can be easily explained to a rancher-owner with as little effort as possible. Rancher-owners have a tendency to question lengthy legal documents.

4. Amend the agreements to allow for spotting to be carried on prior to the final signing of the agreement in order to be able to arrive at a more definite cost figure for both the State and cooperator.

III Spotting Technique:

Early in the project, in order to facilitate the training of personnel and to be certain that the Burney flat unit (see Map I) was covered in order that it could be used as a control area, 100 per cent area spotting was practiced. This type of spotting means locating, marking, and recording trees that are infested with insects by a crew composed of two spotters and a compassman actually walking through and covering the entire Entomological unit using section lines as base control. Usually each spotter covered a five chain strip on each side of the compassman.

Near the close of the project we dropped this formal area spotting technique in favor of group spotting which, of course, is only applicable to Ips group infestations. This type of spotting consists of locating serious group infestations by a preliminary road or high point reconnaissance, and then sending treating crews into the group accompanied by one spotter who marks the trees just ahead of the treating crew. The spotter usually marks isolated infested trees 200 or 300 yards from the main group also.

Future observations in the area will determine which method is the most desirable for Ips control. However, from an inspection of the spotting plat sheet, which shows the number of infested trees spotted by forties, one can readily see that high insect population was usually found in definite, easily-defined groups. One will note from the map that in the Burney Flat unit, as few as 37 infested trees were found to a section or 640 acres.

While the cost of formal area spotting will vary with several factors such as skill and experience of the spotting crew, topography, degree of infestation, weather, width of strip covered, etc., Table II gives representative sample figures for the cost of formal area spotting by a three-man crew, spotting a strip 10 chains wide.

TABLE II SPOTTING COSTS

Date	No. of 3-man Spotting crews	Total acres spotted	Salary & Wages *
Feb. 17	1	320	29.25
Feb. 20	1	160	29.25
Feb. 22	1	240	29.25
Mar. 19	2	480	58.50
Mar. 20	3	520	87.75
Mar. 21	3	640	87.75
Mar. 30	1	160	29.25
Totals		2,520	351.00
	Average cost per acre	$ .139	

*This figure is based on a base rate of $195.00 per month on a 5-day week basis and allows for holidays, etc. Also note that these costs do not include transportation, housing, subsistence supplies, etc.

It is almost impossible to prorate cost for group spotting but it is readily apparent that it is much less costly than formal area spotting. It should be pointed out, however, that there is not complete accord as to which is the better type of spotting for Ips control. Proponents of group spotting offer the following points for consideration:

1. The cost to find a few isolated infested trees cannot be justified.

2. The isolated trees may not have heavy enough broods to cause further damage.

3. Isolated infested trees may recover.

4. Time and money being limiting factors, more insects can be destroyed by treating groups than by treating isolated trees.

Yet several problems and questions present themselves for solution and answer in group spotting. Among them are:

1. Is such spotting for Ips entomologically sound?

2. If preliminary reconnaissance is not well-planned and organized, treating crews waste effort in locating the groups to be treated.

3. In areas of scattered ownership, what is the best method to use to determine property lines?

From Table IV we can find that out of a total of 1240 man days on all phases of the project, 160 man days or 12.9 per cent were expended on spotting effort. This effort cost $1,483.82 and resulted in spotting 1,429 trees and 2,168 poles, covering 11,020 acres.

IV Control Techniques:

As mentioned earlier in this report, one of the objectives of this project was to salvage a maximum amount of merchantable timber destroyed by insects. However, a considerable number of infested trees were either below the minimum merchantable diameter limit or were inaccessible or impracticable of salvage operations. Thus our control operations fell naturally into two separate types: namely salvage control, and direct control.

A. Direct Control:

Direct control measures were usually carried out on the lands of small rancher-owners or, as with the Fruit Growers Supply Company, on isolated trees or groups where logging was not economically possible.

In direct control operations, all Ips-infested trees either in poles under 12 inches d.b.h. or tops of larger trees were cut, piled, and burned. All D.b. infested trees were also cut, piled, and burned, if in trees less than 12 inches d.b.h. In D.b. trees over 12 inches d.b.h., the infested portion of the bole was peeled and the infested bark burned. Trees infested with flatheads or other species were similarly treated, depending upon diameter class. Green butts or the non-infested portions of trees or poles were not treated. This latter point has caused considerable discussion in that some feel that such a procedure creates more breeding grounds for the beetles. However, it was felt that it was better to speed the control work on the present brood of insects rather than concern ourselves with what might happen. Should the green basal portions that remain in the woods become seriously infested, perhaps control measures can be devised to solve the problem. The green butts remaining in the woods are not great in number.

The most critical factor in both direct and salvage control operations was found to be the burning process. The number of infested trees or poles treated per day was dependent mostly on the conditions affecting the burning; namely:

1. Type of weather
2. Amount of material to be disposed of
3. Topography
4. Vegetative cover

During wet weather the piles would refuse to burn rapidly or

satisfactorily. During dry periods and high winds, the fires would have a tendency to run and spot. Therefore, fire lines had to be constructed and the fires watched. During the entire project, there were only a few short periods when burning conditions were ideal.

Direct control is a much slower process than salvage control. Table III shows actual samples of field accomplishments by direct control crews.

TABLE III DIRECT CONTROL

Date	Man Days	No. of Poles	No. of Trees	D.B.H. Class of Trees												Volume
				14	16	18	20	22	24	26	28	30	32	34	36 & over	
4/11	16	8	27	4	1	1	5	2	2	1	4	3	3		1	19,010
4/9	16	-	18	8	4	3	1	2								6,220
4/9	7	2	15	3	1	1	3	2			2		1		2	8,540
3/21	9	13	32	7	10	4	4	3	2	1	1					13,230
4/10	5	1	9	1			3	1	3	1						4,940
4/7	5	3	5			1	2	2								2,430
4/7	4	1	12		3	4	1	1	2		1					5,110
4/12	19	30	6		2	1	1		1	1						2,930
3/23	3	1	4	1	2	1										1,320
3/26	23	16	30	5	7	5	3	2	1	2	2	1	1	1		15,620
3/22	12	2	21	4	6	2	5	1		1			1	1		10,030
3/24	9	4	36	6	6	8	4	4	3	1	2	2				17,330
	128	81	215													106,710

Average vol. treated per man day - 834 f.b.m.
Average no. of trees per man day - 1.53

B. Salvage Control:

Salvage control operations are extremely desirable for two important reasons. These are:

1. Salvage operations will usually reduce the overall cost of the control program.

2. Unnecessary waste of raw material is avoided.

On this project salvage operations were carried on whenever possible, but not always under the same circumstances.

The McCloud River Lumber Company, whose cooperation on the project was outstanding, carried on their own salvage operations. The Division of Forestry's contribution consisted mostly of spotting, although treating crews did work on the McCloud operation to a limited extent. The McCloud River Lumber Company has for a good many years been conducting salvage insect control operations on timber under their control and have found it to be a sound practice. During this project, the Division of Forestry accomplished the following on their lands:

Man Days Spotting	Man Days Treating	No. of Trees Spotted	No. of Poles Spotted	Acres Spotted
43	16	303	265	1,840

The McCloud River Lumber Company with their own personnel and equipment spotted and treated under salvage control approximately 1,820 acres of timber as well as carrying on almost all the treating operations on the area spotted by the State. Final accounting figures on this operation, however, will have to form a supplement to this report since the essential data will not be in its final form for several months.

Salvage control operations on the lands of the Fruit Growers Supply Company were carried on under entirely different circumstances than that on the lands of the McCloud River Lumber Company. Since the Fruit Growers Supply Company had, during the progress of the project, acquired title to the timber and lands to be treated, it was impractical for them to carry on their own salvage operations; but yet they desired to wholeheartedly cooperate with the undertaking. Hence, this company chose to operate under clause 3 of page 2 of the Cooperative Agreement form (see appendix). The Fruit Growers Supply Company, besides contributing stumpage with a value over $4,000, also made a $2,000 cash contribution to the project to reimburse the State for treating trees or poles which were inaccessible or impracticable of salvage. (Direct Control).

This type of salvage operation made it necessary for the State to negotiate with operating companies in the area to remove the salvage.

Most all operators in the area were contacted, but since the operation was a major one, only the larger companies were in a position to attempt it. Since the operation would also mean that the logging company would have to forego normal operations and profit, the Scott Lumber Company and the Burney Lumber Company, the companies who removed the salvage, demonstrated a fine cooperative spirit. Practically all of the salvage operation on Fruit Growers Lands was carried on within the Burney Flat infestation unit.

It was felt that since a third party was involved in the salvage operation, that certain definite working principles be understood "on the ground." The following points were included in the working arrangements:

1. Each logging company was assigned a definite area to work in. In order to keep relationships harmonious, the amount of volume, logging conditions, distance of haul, etc. had to be equalized as nearly as possible. Both companies had the same deadline date to remove the salvage.

2. In order to avoid confusion, provisions were made to identify tree stumps.

3. Since each company did not have to pay stumpage, they were required to fall, limb, buck, and lop, as well as yard, load, and haul the merchantable trees. It was felt that the additional cost of such work over normal operations was nearly offset by the "cost-free" stumpage.

4. Provisions were made to ensure reasonable logging operations.

5. The State provided the necessary maps and assistance to locate the infested trees and carried out the actual treating operations.

Below is a recapitulation of these activities:

Burney Lumber Company salvage operations:

Acres treated	2,800 acres
Salvage removed	461,230 f.b.m.
Average salvage per acre	165 f.b.m.

Scott Lumber Company salvage operations:

Acres treated	2,960 acres
Salvage removed	319,000 f.b.m.
Average salvage per acre	108 f.b.m.

Total acres treated	5,760
Total salvage removed	780,230
Average salvage per acre	136 f.b.m.

One of the companies handling the salvage for the State has reported the following statistics:

Average cost of normal timber to pond per M.	11.89	
Average cost of infested timber to pond per M.	13.99	
Added cost per M.		2.10

Cost of normal timber through mill at average rate of 12,000 per hr. per M.	8.74	
Cost of infested timber through mill at average rate of 9,000 per hr. per M.	11.80	
Added cost per M.		3.06
Realization of normal average Ponderosa pine	37.89	
Average realization of infested timber after deducting for stain	34.17	
Net difference between normal realization and insect realization		3.72
Total added cost & less realization		8.88 per M.

This $8.88 per thousand represents the difference between normal operating margin and salvage margin. It is presumed that a portion of this deficit is compensated for by cost-free stumpage. Operating companies have paid as high as $7.00 per M. for small tracts of timber in the area, while they charge only approximately $4.00 per thousand for stumpage when operating in their own timber. Whether a company can handle salvage logs on such emergency projects at a reduced profit margin over a normal operation or must operate at a loss depends, of course, on many factors which only comprehensive cost analysis studies will reveal.

The fact that the average salvage removed per acre by the Burney Lumber Company is greater than that removed by the Scott Lumber Company can be explained by a difference in operating procedure by the company concerned. Abandoned snags on the salvage area were not marked for removing by the spotters since they did not contain broods of insects, but their removal was left to the discretion of the operating company. Burney Lumber Company chose to remove a greater proportion of snags than Scott Lumber Company. Hence, their salvage per acre was greater.

Since this was an emergency project, plans for carrying out the salvage operations were not necessarily the ultimate in such operations, and several problems arose which were not anticipated, but should be considered in future operations. Among these were:

1. On scattered infested timber it was necessary to spot or find the infested trees during four separate operations; these were the original spotting, locating the trees for the fallers, locating the trees for the yarding "cats", and finally the treating crews had to locate them. All of this locating and relocating was time consuming and costly.

2. When the operations are carried on by a more or less disinterested third party, the salvage must be timed to their operation.

3. While further study must be given to the matter to determine how serious the problem was, it may be that by skidding infested logs great distances through the woods, there was a tendency to defeat

our purpose, since some loose infested bark sloughed off during such operation and perhaps scattering the insects.

4. Long skidding operations can create a trespass problem on lands of scattered ownership. Some owners may object to the excessive damage as well as the trespass. Only one minor incident occurred on this project. However, it can be foreseen that a serious problem could be created in future projects.

In spite of these above objections, it was to the advantage of the Division of Forestry to carry on salvage operations. The following graph shows the comparison between salvage and direct control operations as far as volume treated per man day of labor is concerned.

If salvage operations had not been carried on, it is obvious that our costs of treatment would have been materially greater, and the area covered would have been reduced greatly. This latter point was quite important since, while at no time did we hope to carry out control work on all entomological units, it was necessary that as complete job as possible be accomplished. Yet since the project did not get under way until February 19 and effective control was thought not to be practical after April 15, the time available to cover the area was a very limiting factor.

V Activities of other agencies:

From the inception of the project to its completion a most gratifying aspect was the splendid cooperation shown by all private persons and agencies as well as public agencies concerned. This project demonstrated very effectively that when a mutual public problem presents itself for solution, all barriers to its solution can usually be eliminated by applying the principles of mutual assistance and cooperation.

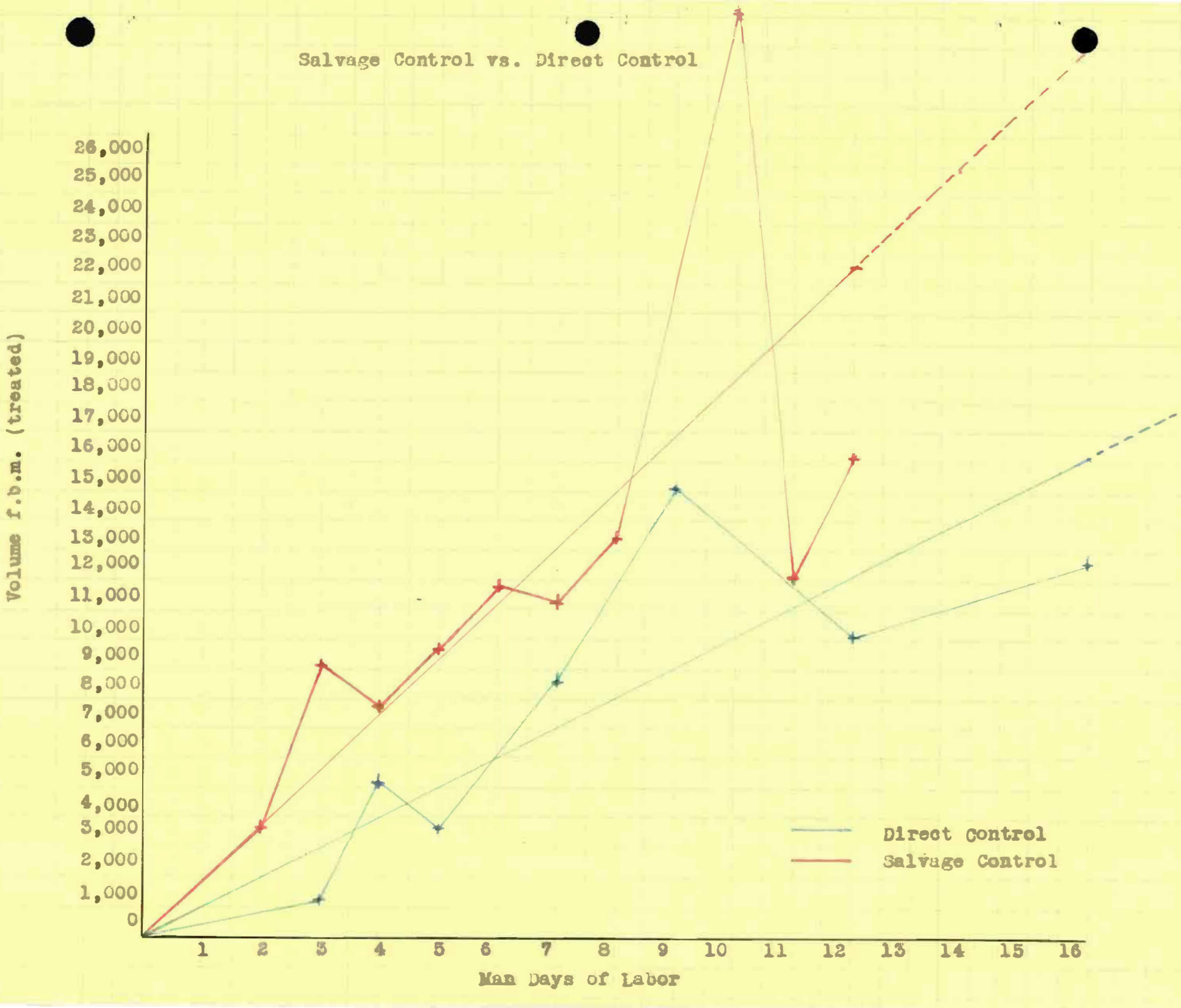
Besides those agencies already mentioned, the following also were extremely active in the program:

United States Forest Service: appropriated approximately $13,000 to carry on control measures on some 12,000 acres of National forest lands, treating some 10,840 trees and poles. (See map)

State Division of Parks: carried on control measures in the Burney State Park comprising an estimated 300 acres, treating 140 trees and poles. (See map)

State Division of Highways: appropriated $2,500 to carry on control measures on State highway right-of-way lands in the project areas. The Division of Forestry spotted the infested trees, but Highway crews did the actual treating along 84 miles of right-of-way treating 198 trees.

Burney Boy Scouts: treated 150 trees and poles around the townsite of Burney.


Salvage Control vs. Direct Control
Volume f.b.m. (treated)
26,000
25,000
24,000
23,000
22,000
21,000
20,000
19,000
18,000
17,000
16,000
15,000
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Man Days of Labor
Direct Control
Salvage Control

IV Project appraisal:

Most all those connected with the project either closely or remotely feel that the project was a worthy one. By carrying out control measures on 11,020 acres and treating 1,429 trees and 2,168 poles, the Bureau of Entomology considers that the Division of Forestry has given protection to 87,440 acres of valuable timber out of a total of 149,760 acres in the Burney Flat, Goose Valley, Clark Creek, Doyel Butte, and Hat Creek units.

This protection was given for a total State expenditure of $11,502.50. This seems to be a sound investment.

On this project the following figures were arrived at:

Average cost to area spot	$.139 per acre
Direct control treating	834 f.b.m. per man day
Salvage control treating	1,858 f.b.m. per man day

Since there are a great many variables, this data probably cannot be used universally. However, it gives an indication of what can be expected generally and it is felt that the data can be used for estimating cost of future control projects.

While a few problems were encountered that were not anticipated, most were finally worked out to the satisfaction of all concerned and nothing occurred to indicate that the program was not sound in all of its aspects. It is true that the area treated will have to be observed closely in the future to determine how effective our efforts have been; but at this writing it appears that all of the objectives were attained.

VII Recommendations and conclusions:

From our experiences, the following points seem to be worthy of more study in order to smooth out operating procedures:

1. Cooperative Agreements forms should be amended in order that they can be simplified and provisions made for spotting prior to formal signing.

2. A definite recommendation should be secured from the Bureau of Entomology concerning proper spotting technique to be used for Ips control.

3. The burning of infested portions of the trees should be timed and integrated with prevailing weather conditions and entomological requirements to reduce burning costs.

4. Operating companies and timber owners should be encouraged to perform their own salvage operations similar to the McCloud River Lumber Company operation.

5. In order to preserve work already accomplished, a definite

maintenance program should be established for the Burney-McCloud area, and other pine areas should be watched closely to forestall any serious further outbreaks.

As this report is brought to a conclusion, it seems fitting that acknowledgement be given to the California State Legislature whose prompt action in amending the insect law made control measures possible this year and to the State Board of Forestry whose interest and cooperation in the problem made the program possible.

It is also desirable to acknowledge the splendid work, sometimes under adverse conditions, that was performed by the regular Division of Forestry personnel assigned to the project.

APPENDIX A

AGREEMENTS FORMS

FOREST INSECT CONTROL

COOPERATIVE AGREEMENT BURNEY-McCLOUD INSECT ZONE

(Rancher-Owner Form)

This agreement made and entered into at Sacramento, California, this _____ day of _____, 1945, by and between the State of California, acting through its duly appointed, qualified and acting State Forester hereinafter called "State" and _____, hereinafter called "Cooperator", witnesseth:

WHEREAS, section 4455 of the Public Resources Code as amended by Statutes of 1945 reads as follows:

"Whenever the State Forester determines that there exists an infestation of pine beetles or other insect pests injurious to timber or forest growth on privately owned lands and that said infestation is of such a character as to be a menace to the timber or timber lands of adjacent owners, the State Forester with the approval of the State Board of Forestry may declare the existence of a zone of infestation, and describe and fix its boundaries.

"Thereupon, the State Forester or his agents shall have the power to go upon the land within said zone of infestation and shall cause the insect infestation to be eradicated and destroyed in a manner approved by the State Board of Forestry and in order to accomplish the eradication and destruction of such infestation, the State Forester may enter into cooperative agreement with private timber land owners, Federal Government and other public or private agencies, using such funds as have been or may hereafter be made available for such purpose; provided, however, that the State Board of Forestry shall set the ratio of State to private cooperation."

AND WHEREAS the State Forester has determined that there exists an infestation of insect pests injurious to timber of forest growth on privately owned lands in Shasta and Siskiyou Counties, State of California, and, with the approval of the State Board of Forestry has declared the existence of a zone of infestation, which zone consists of lands located in said counties and situated within the declared zone of infestation described in the State Board of Forestry resolution of February 16, 1945.

WHEREAS the State Board of Forestry on February 16, 1945 authorized the State Forester to enter into cooperative agreements with private timber land owners, Federal Government and other public and private agencies for the purpose of controlling and destroying said infestation according to methods commonly used and recognized in such work and approved by the U. S. Bureau of Entomology and Plant Quarantine's representative who shall give technical advice on this insect control project and,

WHEREAS, the State Board of Forestry on the above date fixed the ratio of State to private cooperation at not exceeding 50% of the costs of the eradication and destruction of such insect infestation on the area as a whole, and determined that on limited areas, primarily on "Rancher-Owner" lands, the State Forester, if he deems it wise, may perform all of the insect control work, provided, however, that such work will not exceed the 50% limitation on the area as a whole and,

WHEREAS, cooperator owns the timber or stumpage on certain privately owned lands hereinafter described and situated in said declared zone of infestation, and it is the desire of the parties hereto to enter into a cooperative agreement for the purpose of controlling insect infestation on cooperator's hereinafter described lands;

NOW, THEREFORE, it is mutually agreed as follows:

1. Cooperator and State shall at a mutually satisfactory time enter upon cooperator's lands hereinafter described and with the advice and assistance of the U. S. Bureau of Entomology and Plant Quarantine's representative "spot" and designate trees infested with insects which in their joint judgment should be treated as part of the control project. Each shall bear the cost of its representative in said "spotting" of insect infested trees and such costs shall be credited to the respective agency's share of the cost of the control project.

2. After such insect infested trees have been designated, the State or persons authorized by the State may enter upon the cooperator's land and treat, remove, or otherwise dispose of said insect infested trees. The State may assume the full cost of insect control on cooperator's land, provided, however, that the State expenditures of treating insect infested trees on cooperator's land and all other lands within the zone of infestation does not exceed 50% of the cost of the entire control project. The salvage value as determined by the State Forester of any stumpage that may be salvage logged by persons authorized by the State shall be credited as a contribution by the cooperator towards the cost of the cooperative control project.

Cooperator's contribution to the cooperative control project is estimated to be $_____, and shall consist of "spotting" cost, salvage stumpage value provided said stumpage is salvaged, and any labor contributed to the control project at prevailing wage rates.

State's expenditure for treating or otherwise disposing of insect infested trees on cooperator's land is estimated to be $_____.

3. The control work undertaken by State shall be carried on in a reasonable manner consistent with economical salvage logging and according to methods commonly used and recognized in such work and approved by the U. S. Bureau of Entomology and Plant Quarantine's representative, and State shall not be liable to cooperator for damages to cooperator's property resulting from such operations.

4. Cooperator and State shall each keep accurate accounting records of its control work on cooperator's land to show cost per M. bd. ft. of merchantable-sized trees salvage-logged, cost and number of poles treated, and cost and amount of slash treated, and such records shall be open to inspection by cooperator and State at all reasonable times. Upon termination of this agreement each party shall furnish the other party with a statement of expenditures constituting such party's contribution under this agreement.

5. It is further understood and agreed that State shall not be bound by this agreement if sufficient funds are not appropriated and made available for its use. Further, it is understood and agreed that cooperator shall not be bound to perform under this agreement to any greater proportion of its obligation than the proportion that State's performance bears to State's obligation hereunder.

6. It is agreed and understood that any insect control work under this agreement shall be done at the earliest practicable time and this agreement shall terminate June 30, 1945. This agreement may be terminated or amended by mutual consent of the parties hereto.

7. Special stipulations:

8. Description of cooperator's land:

_____
Cooperator Address

State of California

by _____
State Forester (State)

Approved:

_____
Director, Department of Natural Resources

Approved:

_____
Director, Department of Finance

FOREST INSECT CONTROL

COOPERATIVE AGREEMENT BURNEY-McCLOUD INSECT ZONE

(Timber Operator's Form)

This agreement made and entered into at Sacramento, California this _____ day of _____, 1945, by and between the State of California acting through its duly appointed qualified and acting State Forester hereinafter called "State" and _____ hereinafter called "cooperator", witnesseth:

WHEREAS, section 4455 of the Public Resources Code as amended by Statutes of 1945 reads as follows:

"Whenever the State Forester determines that there exists an infestation of pine beetles or other insect pests injurious to timber of forest growth on privately owned lands and that said infestation is of such a character as to be a menace to the timber or timber lands of adjacent owners, the State Forester with the approval of the State Board of Forestry may declare the existence of a zone of infestation, and describe and fix its boundaries.

"Thereupon, the State Forester or his agents shall have the power to go upon the land within said zone of infestation and shall cause the insect infestation to be eradicated and destroyed in a manner approved by the State Board of Forestry and in order to accomplish the eradication and destruction of such infestation, the State Forester may enter into cooperative agreement with private timber land owners, Federal Government and other public or private agencies, using such funds as have been or may hereafter be made available for such purpose; provided, however, that the State Board of Forestry shall set the ratio of State to private cooperation."

AND WHEREAS the State Forester has determined that there exists an infestation of insect pests injurious to timber or forest growth on privately owned lands in Shasta and Siskiyou Counties, State of California, and, with the approval of the State Board of Forestry has declared the existence of a zone of infestation, which zone consists of lands located in said counties, and situated within the declared zone of infestation described in the State Board of Forestry resolution of February 16, 1945.

WHEREAS the State Board of Forestry on February 16, 1945 authorized the State Forester to enter into cooperative agreements with private timber land owners, Federal Government and other public and private agencies for the purpose of controlling and destroying said infestation acccrding to methods commonly used and recognized in such work and approved by the U. S. Bureau of Entomology and Plant Quarantine's representative who shall give technical advice on this insect control project and,

WHEREAS, the State Board of Forestry on the above date fixed the ratio of State to private cooperation at not exceeding 50% of the costs of the eradication and destruction of such insect infestation on the area as a whole, and determined that on limited areas, primarily on "Rancher-Owner" lands, the State Forester, if he deems it wise, may perform all of the insect control work, provided, however, that such work will not exceed the 50% limitation on the area as a whole and,

WHEREAS, cooperator owns the timber or stumpage on certain privately owned lands hereinafter described and situated in said declared zone of infestation, and it is the desire of the parties hereto to enter into a co-operative agreement for the purpose of controlling insect infestation on co-operator's hereinafter described lands;

NOW, THEREFORE, it is mutually agreed as follows:

1. Cooperator and State shall at a mutually satisfactory time enter upon cooperator's lands hereinafter described and with the advice and assistance of the U. S. Bureau of Entomology and Plant Quarantine's representative "spot" and designate trees infested with insects which in their joint judgment should be treated as part of the control project. Each shall bear the cost of its representative in said "spotting" of insect infested trees and such costs shall be credited to the respective agency's share of the cost of the control project.

2. Cooperator agrees to conduct such salvage logging of merchantable sized insect infested trees as is practicable on its lands herein described; to remove merchantable-sized portions of the insect infested trees as it can and to dispose of the insects in the balance thereof to reduce the insect infestation.

3. Cooperator agrees that if unable to conduct such salvage logging, cooperator shall permit State or persons designated by State to go upon cooperator's lands and salvage log such timber and dispose of the remaining portion thereof without charge to the State for the stumpage involved. However, the salvage value of the stumpage as determined by the State Forester shall be credited as a contribution by the cooperator towards the cost of the cooperative control project.

4. The right to remove designated insect infested trees shall terminate on June 30, 1945, and thereafter this agreement shall not constitute a "cloud" on or a flaw in cooperator's title to the timber lands involved. This agreement shall not be placed on legal record in any county of the State of California.

5. It is further agreed that cooperator will undertake not less than $_____ worth of insect control work on its lands herein described which shall be credited as its portion of the cost of the cooperative insect control project. Said cost shall consist of cooperator's cost of "spotting", salvage value (as determined by the State Forester) or stumpage to be salvage logged, salvage logging costs in excess of current normal logging costs as may be determined jointly by the State and cooperator and the cost of disposing of the unmerchantable portion of the insect infested trees.

6. State agrees to conduct insect control work on cooperator's lands herein described by treating trees of smaller than merchantable-size, called poles, and trees of merchantable size which are inaccessible or impracticable of salvage logging as determined jointly by the State and cooperator; provided, however, that State expenditure for insect control work on cooperator's land and all other lands within the zone of infestation shall not exceed 50% of the cost of the entire control project. Said cost of State's portion of the insect control work on cooperator's land is estimated to be $_____.

Priority of areas to be treated shall be determined in cooperation with the U. S. Bureau of Entomology and Plant Quarantine's representative.

7. The control work undertaken by State shall be carried on in a reasonable manner consistent with economical salvage logging and according to methods commonly used and recognized in such work and approved by the U. S. Bureau of Entomology and Plant Quarantine's representative, and State shall not be liable to cooperator for damages to cooperator's property resulting from such operations.

8. Cooperator and State shall each keep accurate accounting records of its control work on cooperator's land to show cost per M. bd. ft. of merchantable-sized trees salvage-logged, cost and number of poles treated, and cost and amount of slash treated, and such records shall be open to inspection by cooperator and State at all reasonable times. Upon termination of this agreement each party shall

furnish the other party with a statement of expenditures constituting such party's contribution under this agreement.

9. It is further understood and agreed that the State shall not be bound by this agreement if sufficient funds are not appropriated and made available for its use. Further, it is understood and agreed that cooperator shall not be bound to perform under this agreement to any greater proportion of its obligation than the proportion that State's performance bears to State's obligation hereunder.

10. It is agreed and understood that said insect control work shall be done at the earliest practicable time and this agreement shall terminate June 30, 1945. This agreement may be terminated or amended by mutual consent of the parties hereto.

11. Special stipulations:

12. Description of cooperator's land:

_____
Cooperator Address

State of California

Approved: by _____
State Forester (State)

_____
Director, Department of Natural Resources

Approved:

_____
Director, Department of Finance

APPENDIX B

TABLES & MAPS

TABLE IV

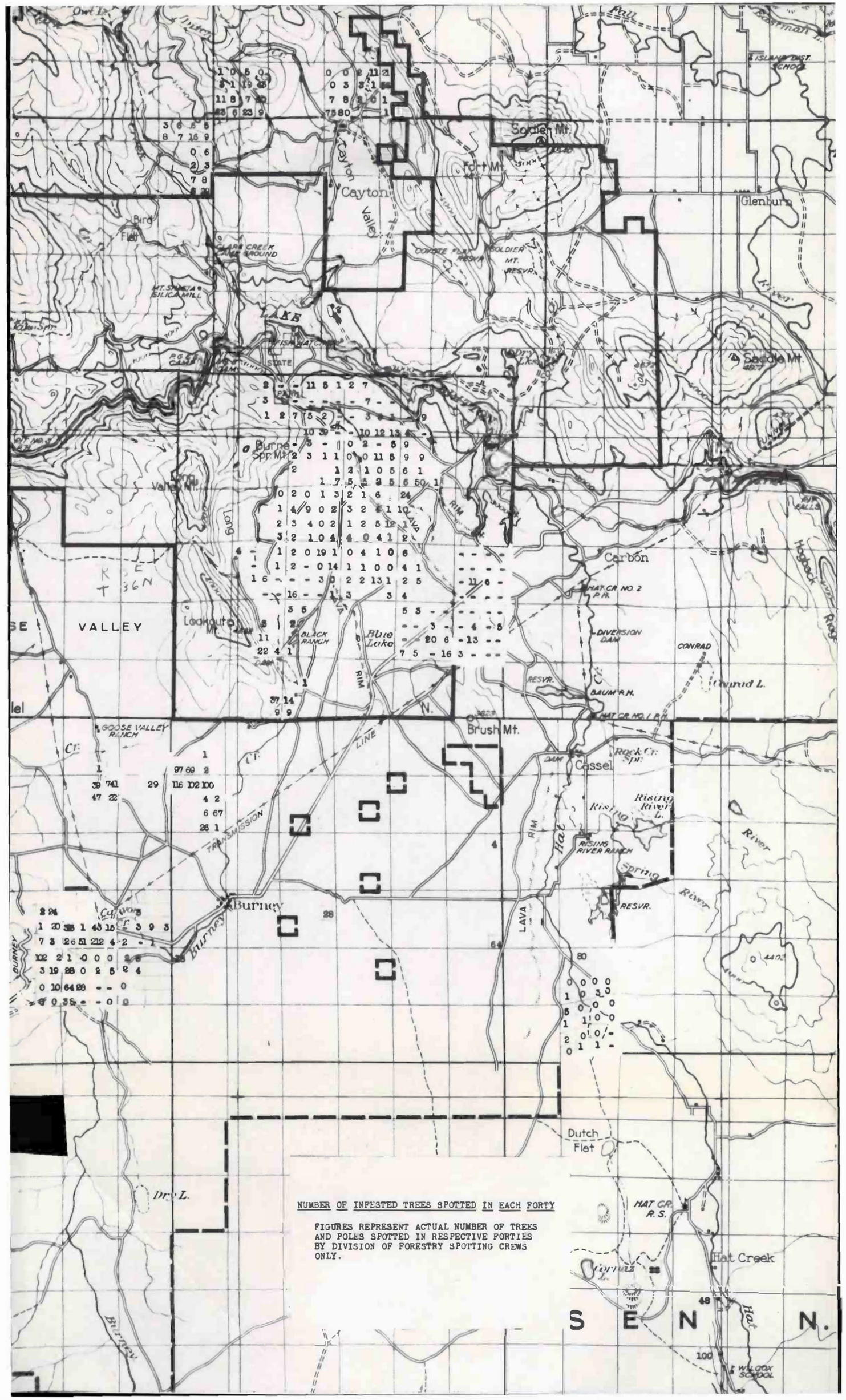
LABOR DISTRIBUTION ON PROJECT BY MAN DAYS

Function	Sub-Function	Man Days	% of Total
Supervision	(Treating Supervision (Spotting Supervision (Soliciting Agreements	99	8.0
Control Operations	(Spotting	160	12.9
	(Treating	703	56.7
Housekeeping	(Cook & Helpers (Camp Sanitation	143	11.5
Office	(Time & Record (Keeping	48	3.8
Transportation	(Travel time (Equipment Maintenance	32	2.6
Tool Maintenance	(Tool repair, Saw (Filing, etc.	18	1.5
Other	(Collecting specimens, (Photos, etc. (Sick leave, C.T.O.	37	3.0
	Total	1,240	100.0

TABLE V

TOTAL STATE EXPENDITURES ON PROJECT

Function	Amount	Total	%
Salaries & Wages:			
Timber Fallers	4203.75		36.54
Kitchen Helpers	208.77		01.82
Cook	389.71		03.39
		4802.23	41.75
Contributed Administrative:			
Labor	4501.50	4501.50	39.13
Operating Expense:			
Subsistence	1311.44		11.40
Auto Servicing	105.35		01.91
Stove Oil	161.18		01.40
Gas & Oil	203.02		01.76
Field Maintenance	33.97		00.30
Field Services	12.45		00.11
Heat, Light, Power, Water	20.82		00.18
Rent	187.50		01.63
Telephone & Telegraph	9.15		00.08
Maps	28.74		00.25
Printing	20.00		00.18
Tools	7.69		00.07
Travel	97.46		00.85
		2198.77	19.12
TOTALS	11,502.50	11,502.50	100.00 %



NUMBER OF INFESTED TREES SPOTTED IN EACH FORTY

FIGURES REPRESENT ACTUAL NUMBER OF TREES AND POLES SPOTTED IN RESPECTIVE FORTIES BY DIVISION OF FORESTRY SPOTTING CREWS ONLY.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
DIVISION OF FOREST INSECT INVESTIGATIONS

INSECT CONTROL UNITS

BURNEY-Mc CLOUD INSECT CONTROL PROJECT

SHASTA AND SISKIYOU COUNTIES, CALIFORNIA

SCALE
0 1 2 3 4 5 6
MILES

R3W R2W R1W R1E R2E R3E R4E R5E

T. 41 N.
T. 40 N.
T. 39 N.
T. 38 N.
T. 37 N.
T. 36 N.
T. 35 N.
T. 34 N.
T. 33 N.
T. 32 N.
T. 31 N.

TO MT. SHASTA

McCLOUD FLATS
BEAR CREEK
SOLDIER MT.
CLARK CREEK
GOOSE VALLEY
BURNEY FLAT
DRY LAKE
DOYLE BUTTE
HAT CREEK
THOUSAND LAKES
BIG SPRINGS
LASSEN VOLCANIC

SHASTA
FOR.

Division of Forestry Control Effort

State Park Control Effort

U.S.F.S. Control Effort

McCloud River Lumber Co. Control Effort

Division of Forestry Group Control Effort

APPENDIX C

FIELD FORMS

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

SPOTTING RECORD

Project area Burney Unit F.O.S. Camp No. 1

Date 3-24-45 Spotter JEH T. 36N R. 3E Sec. 21

Tree No.	Killed by	D B H	Logs	Volume				Remarks
1	Db FR	36		2,000	Db			
2	Ips	32		1,510	Db			
3	Db	18		230				
4	Ips	20		310				
5	Ips	26		770				
6	Ips	18		230				
7	Ips	22		440				
8	Ips	14		150				
9	Db	16		190				
10	Ips	20		310				
11	Ips	24		590				
12	Db	18		230				
13	Db	38		2,300				
14	FR	18		230				
15	Db	20		310				
16	Db	16		190				
Totals,								

Form EQ-38 S—6852 U. S. GOVERNMENT PRINTING OFFICE

A TYPICAL SPOTTING RECORD SHEET

Project area No. Burney Unit F.G.S. Tree No. 2

Killed by Ips

Year ____ { Summer brood ____ / Winter brood ____

Location ____

Forty ____ Sec. 21 T. 36N R. 3E

Owner F.G.S.

	D. BREV.	D. MONT.	IPS.	
Attack				
Parent adult				
Eggs				
Larvæ 0 to .5				
Larvæ .5 to 1				
Pupæ				
New adults				
Emerging				
Abandoned				
Infested length				

FOLIAGE
Green
Fading
Sorrel x
Red
Black

Yellow pine x
Sugar pine

D. B. H. 32"
No. 16-ft. logs
B. F.

Remarks:

8—5223

Date 3-24-45 Camp No. 1

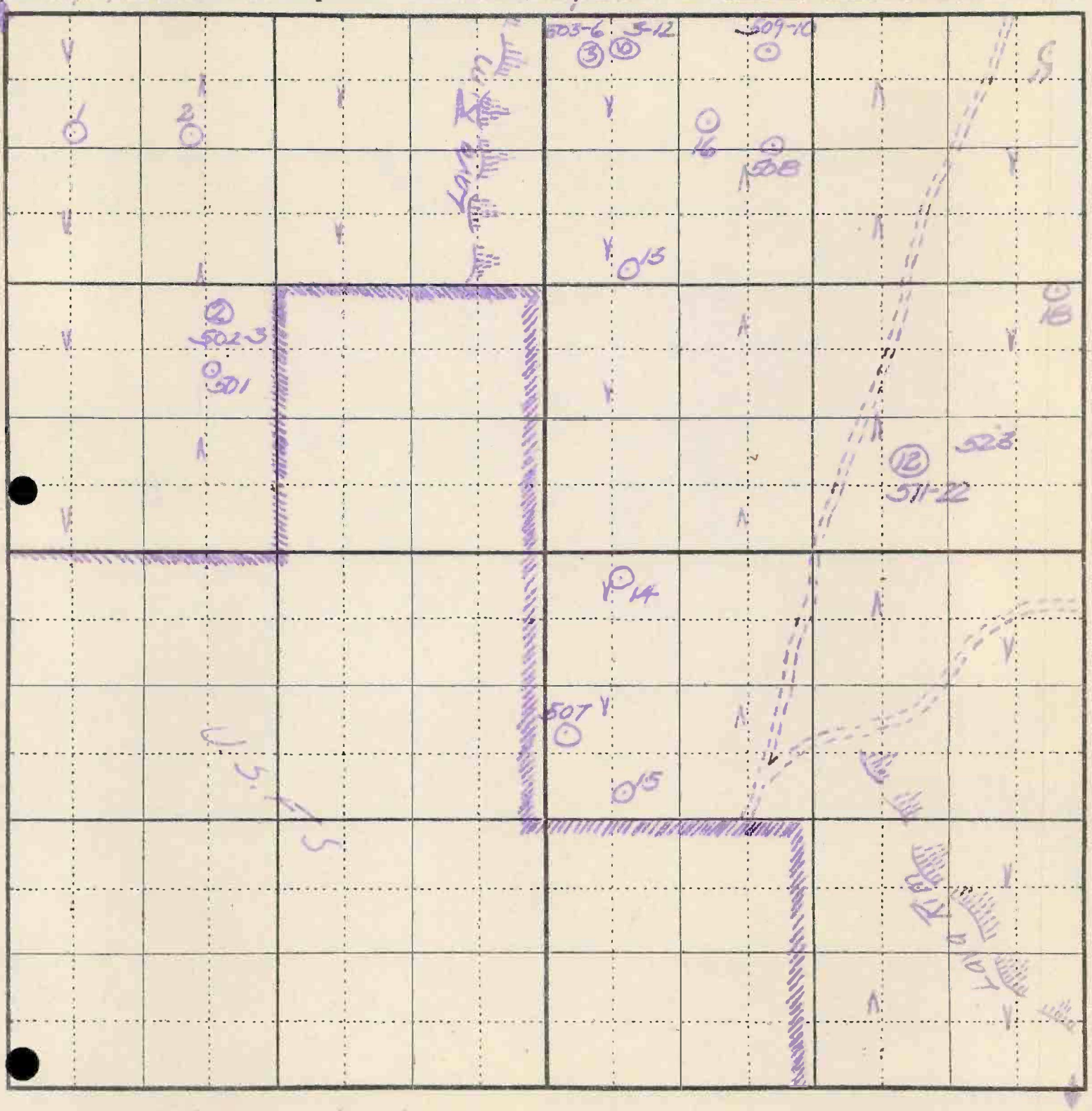
Spotter J.E.H.

A TYPICAL SPOTTING TAG

TREATING PLAT

Project Area Burney **Unit** Fruit Growers **Camp No.** 1

Date 3/24/45 **Compass man** Ernest Silpala **T.** 36N **R.** 3E **Sec.** 21



Remarks: Gelatine duplicators were used to expedite preparation of extra copies of these field maps

FORM F P 2

APPENDIX D

PICTURES

Burney Insect Control Camp

Infested tree to be treated

Pole Treatment. Horse was part of Cooperator's contribution; its use facilitated handling larger poles.

Infested slash pile, just before burning

Pole stand after treatment

Treating tops and slash. The merchantable logs will be salvaged.

Salvage Operation
"Yarding"

Salvage Operation
Log Deck

Merchantable infested trees being felled. This tree will be salvaged. Note spotter's tag.

An idea of some of the conditions the men had to work under.